

A new genus and species of pilumnid (Crustacea, Decapoda, Brachyura) from the Gulf of Mexico

by Ana Rosa VÁZQUEZ-BADER & Adolfo GRACIA

Abstract. — A new genus and species, *Danielum ixbauchac* was established from a crab collected at 65-181.5 m in Campeche Bank, southwestern Gulf of Mexico.

Keywords. — New genus, new species, Pilumnidae, *Danielum ixbauchac*, Campeche Bank.

Un nouveau genre et une nouvelle espèce de pilumnide (Crustacea, Decapoda, Brachyura) du golfe du Mexique

Résumé. — La diagnose du nouveau genre *Danielum* est donnée, avec la description et l'illustration de *Danielum ixbauchac*, nouvelle espèce originaire du banc de Campeche dans le golfe du Mexique. Ce crabe a été récolté sur fonds vaseux entre 65 et 181,5 m de profondeur.

Mots-clés. — Nouveau genre, nouvelle espèce, Pilumnidae, *Danielum ixbauchac*, banc de Campeche.

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INTRODUCTION

The crustacean fauna of the southern Gulf of Mexico is poorly known in comparison with the northern part of the Gulf. The crustacean fauna in Campeche Bay and Tamaulipas State coast were studied by HERNÁNDEZ-AGUILERA & VILLALOBOS, 1980; VILLALOBOS *et al.*, 1981; HERNÁNDEZ-AGUILERA & SOSA, 1982. VÁZQUEZ-BADER & GRACIA (1994) studied the epibenthic macroinvertebrates from the shrimping grounds along the continental shelf of the southwestern Gulf of Mexico, and identified 86 species of crustaceans. Two new species of goneplacid crabs *Euphrosynoplax campechiensis*, and *Pseudorhombila ometlanti* (VÁZQUEZ-BADER & GRACIA, 1991 and 1995) were described from this area.

The study of epibenthic macroinvertebrates from shrimping grounds was conducted in Campeche Bank in the southwestern Gulf of Mexico, from 1992-1994 aboard the R/V *Justo Sierra* of the Universidad Nacional Autónoma de México using a semicommercial otter trawl. Among the collected crustaceans fauna we found a bright red colored crab, unusual for species inhabiting mud bottoms. While studying the material, it was found that this crab species was a Xanthoidea and presented some similarities to the Pilumnidae family *sensu lato*, with some special characteristics, *i. e.* the first gonopod not crooked and the sternite 8 completely covered by the abdomen.

The holotype and two paratypes are deposited in the Colección de la Secretaría de Marina, México D. F., México (SMIOM). Two paratypes are deposited at the Muséum national d'Histoire naturelle, Paris (MNHM). Abbreviations used in the text are: cx, coxa, pl, pleopod, p, periopod.

DANIELUM gen. nov.

TYPE SPECIES. — *Danielum ixbauchac*, new species.

ETYMOLOGY. — The name is given in honor of Dr Danièle GUINOT, in recognition to her many valuable contributions to the study of Brachyura. Gender is neuter.

DIAGNOSIS

Carapace subcircular, very granulate and setose, regions not well defined, gastric and cardiac regions inflated, mesogastric region defined by a pair of parallel furrows joining anteriorly to form pronounced and deep median furrow. Front bilobed, deflexed, forming two lobes, each with 5 to 6 small acute spines. Orbits broad; supraorbital margin with a notch. Eyestalks broad, with a dilated cornea. Antennules folding transversely. Epistome narrow, with thin lip. Third maxilliped not widely gaping. Sternum straight at level of pl, very reduced at level of cx5, segments 2 and 3 with a deep medial depression; sternal sutures 3/4, 4/5, and 5/6 discontinuous, 6/7 and 7/8 continuous. A "bouton-pression" apparatus at level of sternite 5, just below of suture 4/5. Abdominal depression narrow and deep. Sternite 8 not visible in any portion at level of first or second abdominal segment. Abdomen narrow, with seven segments free. First segments reaching coxa of p5. Male sexual openings on condyle of cx5. In female, gonopores narrow, unsculptured. Male gonopod (pl1), elongate, apex not well developed, terminal aperture narrow, a field of small spinules on posterolateral margin. Second gonopod (pl2), short, sigmoid, terminal process curved and distally tapered with a pair of short flagellum.

Danielum ixbauchac n. sp.

(Figs 1a-b; 2a-f; 3a-c; 4a-b; 5a-b; 6a-b; 7a-b; 8a-b)

MATERIAL EXAMINED. — Southwestern Gulf of Mexico: MOPEED 12 st. J-1 (off Terminos Lagoon, Campeche, México) 19°28.7'N-92°36.6'W, 1 ♂ holotype, SMIOM 04067; MOPEED 4 st. X-1 (off San Pedro and San Pablo Rivers, Campeche, México) 19°16.7'N-92°44.1'W, 161 m, 14 November 1992, 1 ♂, SMIOM 04068, 1 ♂ MNHN-B24891; MOPEED 1 st. C-1 (off Terminos Lagoon, Campeche, México) 19°46.6'N-91°55.5'W; 65 m, 16 February 1992, 1 ♀, MNHN-B24892; MOPEED 4 st. W-2 (off San Pedro and San Pablo Rivers, Campeche, México) 19°15.5'N-92°45.5'W; 181.5 m, 25 June 1992, 1 ♂, SMIOM 04069.

KNOWN RANGE AND HABITAT. — Banco de Campeche (Campeche, México); from 65 to 181.5 m depth. On muddy sediments near rocky bottoms.

ETYMOLOGY. — The specific name is derived from the mayan language, *ixbau* (sea crab) and *chac* (red), referring to the conspicuous and brilliant red color.

DESCRIPTION

Carapace (Fig. 1a) subcircular, anterior half deflexed; as wide as long, widest at level of third teeth; surface very granulate and setose, setation and granulation more prominent on and adjacent to margins. Front (Fig. 4a) narrow, about 1/3 the greatest width of carapace, deep median



FIG. 1. — *Danielum ixbauchac* new genus, new species. Carapace, male holotype (SMIOM 04067), length: 19.5 mm. a, dorsal view; b, anterior ventral view.

Danielum ixbauchac n. g., n. sp. Carapace, holotype mâle (SMIOM 04067), longueur : 19,5 mm. a, vue dorsale ; b, vue antérieure ventrale.

groove, cut into two lobes with five to six small acute spines, each lobe with deep groove followed by an acute spine at internal angle of orbit. Supraorbital margin granulate with shallow notch. Anterolateral margin with four acute teeth, the first triangular, second longer and more acute than the first, both of them at same level, third and fourth directed anteriorly, the last is shorter than second and third. Posterolateral flange of carapace narrow and bordered by thin lip; posterolateral margins almost straight.

Epistome (Figs 1b, 3a) finely granulate with median prominence, paired subepistomal lobes sinuous. Sternum (Figs 2b, 6b, 3c, 7b) very granulate and setose, granulate and setose less evident in narrow, triangular and deep abdominal depression; sternal suture 2/3 is a continuous line, 3/4 discontinuous in median portion by a depression on sternite 3; sutures 4/5 and 5/6 discontinuous, 6/7 and 7/8 continuous.

Abdomen (Figs 6a, 7a, 8a-b) in both sexes finely granulated. In holotype male (Fig. 2a), first and second abdominal segments reach coxa of fifth pereopod, both have the same width; segments 3 to 5 are broader than the two former, 6 narrow, triangular, the last (telson), is longer than the preceding. In paratype female (Fig. 3b), segments 1 and 2 are the narrowest, 3-5 are broad, last is broad and heart-shaped.

Suborbital margin spinulate, internal lobe terminating in 2-3 acute spines, visible in dorsal view. Eyestalks finely granulate, broad, anterior depression just proximal to dilated cornea, dorsally with long soft setae. Basal article of antennules with a longitudinal, granulate crest, second and third article nearly equal in length and subcylindrical. Basal antennal article short, not reaching the front, basally with operculum of excretory pore, following three articles elongate, decreasing in length.

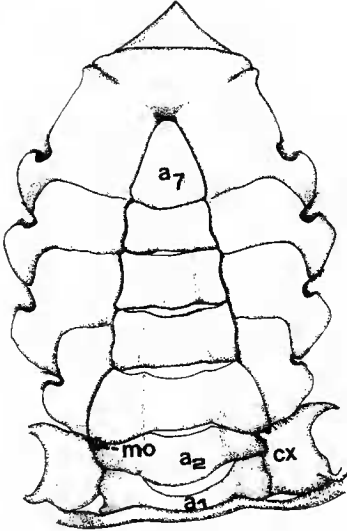
Third maxillipeds (Fig. 3a) not widely gaping, ischium granulate with medial longitudinal furrow and scattered bristles; merus coarsely granulate, distomesial margin spinulate, terminating in a small acute spine, distolateral corner rounded.

Chelipeds (p1) (Figs 5a-b), unequal, shorter than the first walking leg (p2), spinulate and with long soft setae. Movable finger of larger cheliped with lobiform teeth, superior margin with coarse granules and four-five rows of short setae; fixed finger with triangular teeth and with two rows of setae. Inner face of palms punctate; outer, spinulate and setose (aprox. twelve large, curved spines); superior border with coarse granules and two rows of seven-eight acute spines; inferior border spinulate. Carpus with strong, triangular tooth on inner angle, tip directed anteriorly; inner face finely granulate, outer spinulate with long setae. Merus with acute spine on superior margin, inner face granulate, outer granulate with five spines and few setae. Smaller cheliped of similar structure, but palm less elevated and spines more acute; fixed finger with triangular tooth.

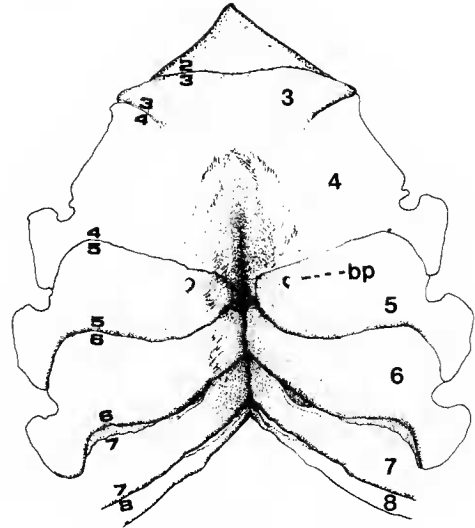
FIG. 2. — *Danielum ixbauchac* new genus, new species; male (SMIOM 04068). a, sternum-abdomen; b, sternum with sternal sutures; c, first gonopod, right mesial surface; d, first gonopod, terminal aperture; e, first gonopod, posterior view; f, second gonopod, right mesial surface. Scale = 1 mm. a1-a7, abdominal segments 1-7; b.p., "bouton-pression" apparatus; cx5, coxa of fifth pereopod; m.o., male genital openings; 3-8, thoracic sternites; 2/3-7/8, sternal sutures.

Danielum ixbauchac n. g., n. sp.; mâle (SMIOM 04068). a, sternum-abdomen; b, sternum avec sutures sternales; c, premier gonopode, vue postérieure; f, deuxième gonopode, surface mésiale droite. Échelle = 1 mm. a1-a7, segments abdominaux 1-7; b.p., système « bouton-pression »; cx5, coxa du cinquième péripode; m.o., ouvertures génitales mâles; 3-8, sternites thoraciques; 2/3-7/8, sutures sternales.

a



b



c



d



e



f



Dactyls of walking legs 1-4 (p2-p5) (Fig. 4b), elongate, little longer than propodi, with corneous tip; and 3 to 4 longitudinal rows of close-set setae. Propodi punctate, with long soft setae on anterior and superior margins. Carpi of p2-p3 with 2-3 acute spines, p4 and p5 without spines. Meri of p2 to p5 with 7 to 10 large, curved spines on superior margin and long setae on superior and anterior margins.

First male gonopod (P11) (Fig. 2c-e), elongate, forming tapered, compressed tube; margins sinuous; apex weakly lipped; terminal aperture narrow, distal boss along middle third of length of anteromesial margin and armed with small spinules; similar field of spinules along length of posterolateral margin. P12 (Fig. 2f) short, sigmoid, terminal process curved with small spinules, a pair of short flagellum on distal end.

Size: carapace length and width of male holotype 19.5 and 20.0 mm, respectively (SMIOM 04067); male 19.1 and 20.0 mm (SMIOM 04068); male 17.4 and 18.2 mm (MNHN-B24891); female 13.8 and 14.8 mm (SMIOM 04069); female 14.0 and 16.2 mm (MNHN-B24892).

Color: dorsal and ventral surfaces of carapace with red spots of different shape. Each frontal lobe has a spot extending to protogastric region; spots on both sides of orbital and hepatic regions, mesogastric region has one spear-like spot, also urogastric and cardiac region with red spot. In ventral view, antennules, antennas, epistome and superior border of merus of third maxilliped red spotted; suborbital margin has two spots, one extending to subhepatic region. In some specimens sternum and abdomen red spotted. Palms with transversal and longitudinal spot, merus and carpus colored. Walking legs (1-4), are banded with red and white spots. In alcohol, specimens present the same color pattern, but the color fade to orange.

REMARKS

Danielum, new genus presents a typical cyclometopian organization (GUINOT, 1969): anterolateral margin toothed and slightly arched. The male sexual openings are circular and situated in a coxal position. The abdomen base covers completely the space between coxa of last walking legs, the sternum is straight and little wide at level of P1.

Danielum, new genus shares some characteristics with the family Xanthidae MacLeay, 1838 (GUINOT, 1978: 272). These are: the type of the sternum, straight or wide, 4/5 and 5/6 sternal thoracic sutures discontinuous, 6/7 and 7/8 continuous, the presence of a "bouton-pressure" apparatus, male sexual openings always in a coxal position, sometimes a small portion of 8th sternite visible. Although, the carapace shape and the pleopod of *Danielum* new genus does not resemble any known Xanthidae species.

On the other hand, *Danielum* presents several characteristics of the family Pilumnidae *sensu* Samouelle, 1819 (GUINOT, 1978: 274) like the setose carapace, spiny front, coxal male openings, second gonopod short and sigmoid, as well as free abdominal segments of different shape. It mainly resembles genus *Pilumnus* Leach, 1815 (RATHBUN, 1930: 481), in the proportion between length of front and length of carapace; front cut into two spiniform lobes and each separated from the supraorbital angle by a groove or notch; sternal sutures 4/5, 5/6 discontinuous; abdomen of male consists of seven separated segments, basal antennal article short, not touching inner orbital angle; anterolateral border not longer and cut into spiniform teeth. However, it presents

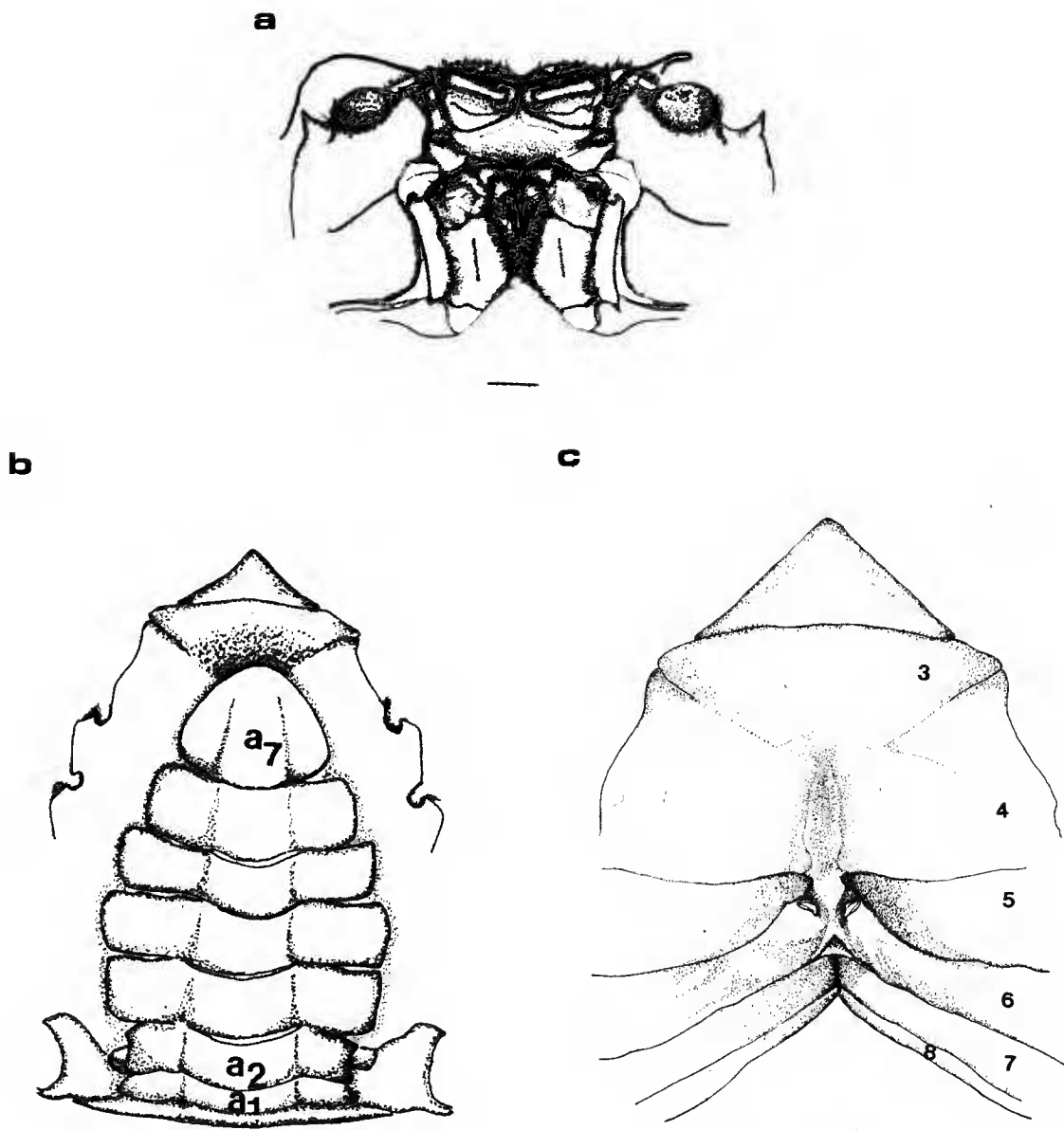


FIG. 3. — *Danielum ixbauchac* new genus, new species. a, male holotype (SMIOM 04067), anterior ventral view; b, female (SMIOM 04069), abdomen; c, female sternum with gonopores (SMIOM 04069). Scale = 1 mm. a1-a7 abdominal segments; 3-8, thoracic sternites.

Danielum ixbauchac n. g., n. sp. a, holotype mâle (SMIOM 04068), vue antérieure ventrale; b, femelle (SMIOM 040609), abdomen; c, sternum de la femelle avec gonopores (SMIOM 04069). Échelle = 1 mm. a1-a7, segments abdominaux; 3-8, sternites thoraciques.

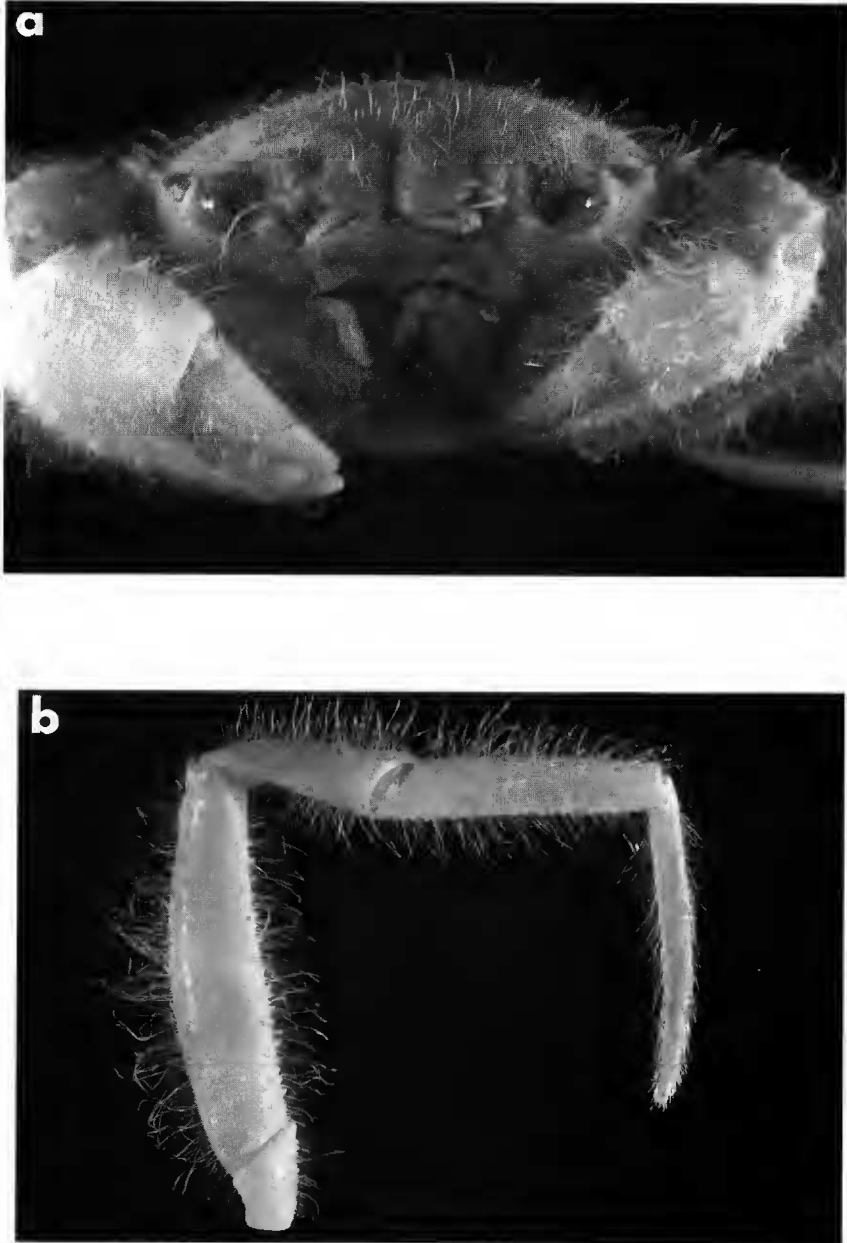


FIG. 4. — *Danielum ixbauchac* new genus, new species, female (SMIOM 04069), length: 13.8 mm. a, front-orbital region; b, male (SMIOM 04068), third right peritopod.

Danielum ixbauchac n. g., n. sp., femelle (SMIOM 04069), longueur: 13,8 mm. a, région fronto-orbitale ; b, mâle (SMIOM 04068), troisième péréiopode droit.

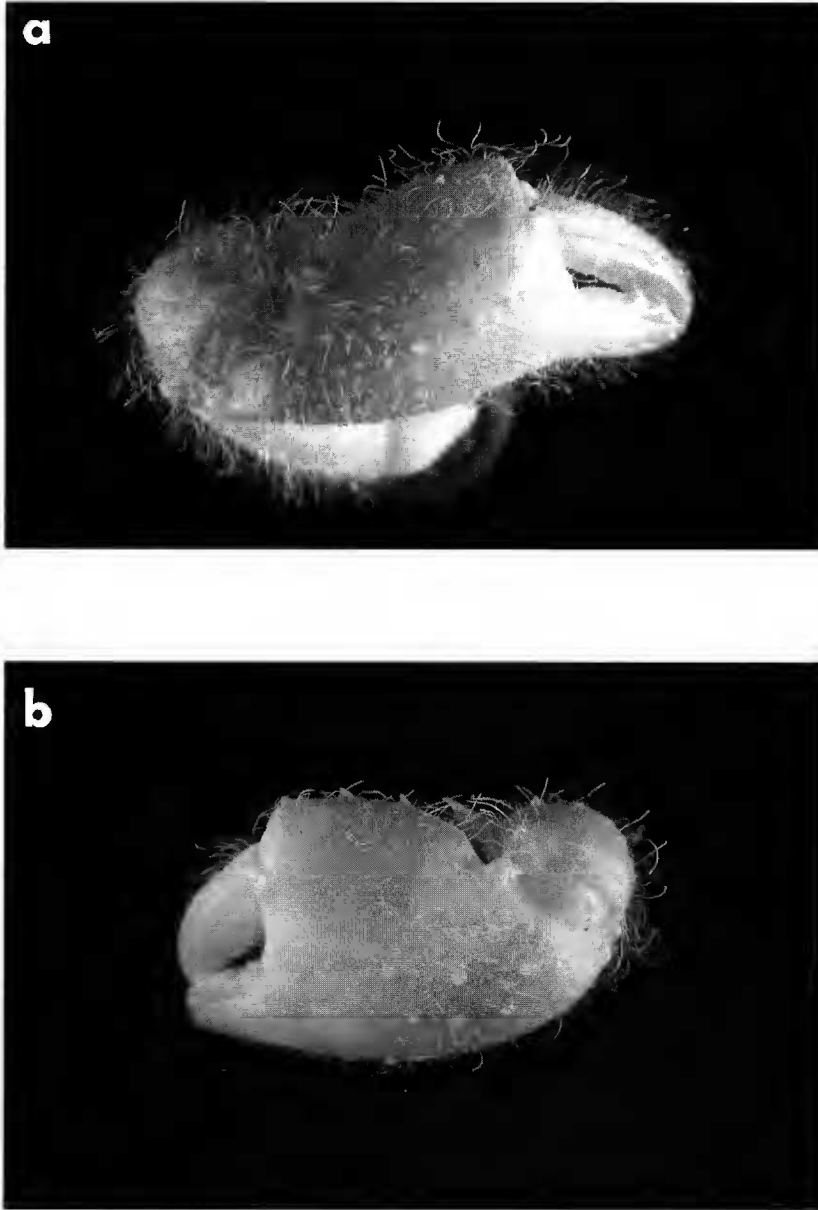


FIG. 5. — *Danielum ixbauchac* new genus, new species, male (SMIOM 04068), length: 19.1 mm. a, major cheliped, external view; b, minor cheliped, external view.

Danielum ixbauchac n. g., n. sp., mâle (SMIOM 04068), longueur : 19,1 mm. a, grand chélipède, vue externe ; b, petit chélipède, vue externe.

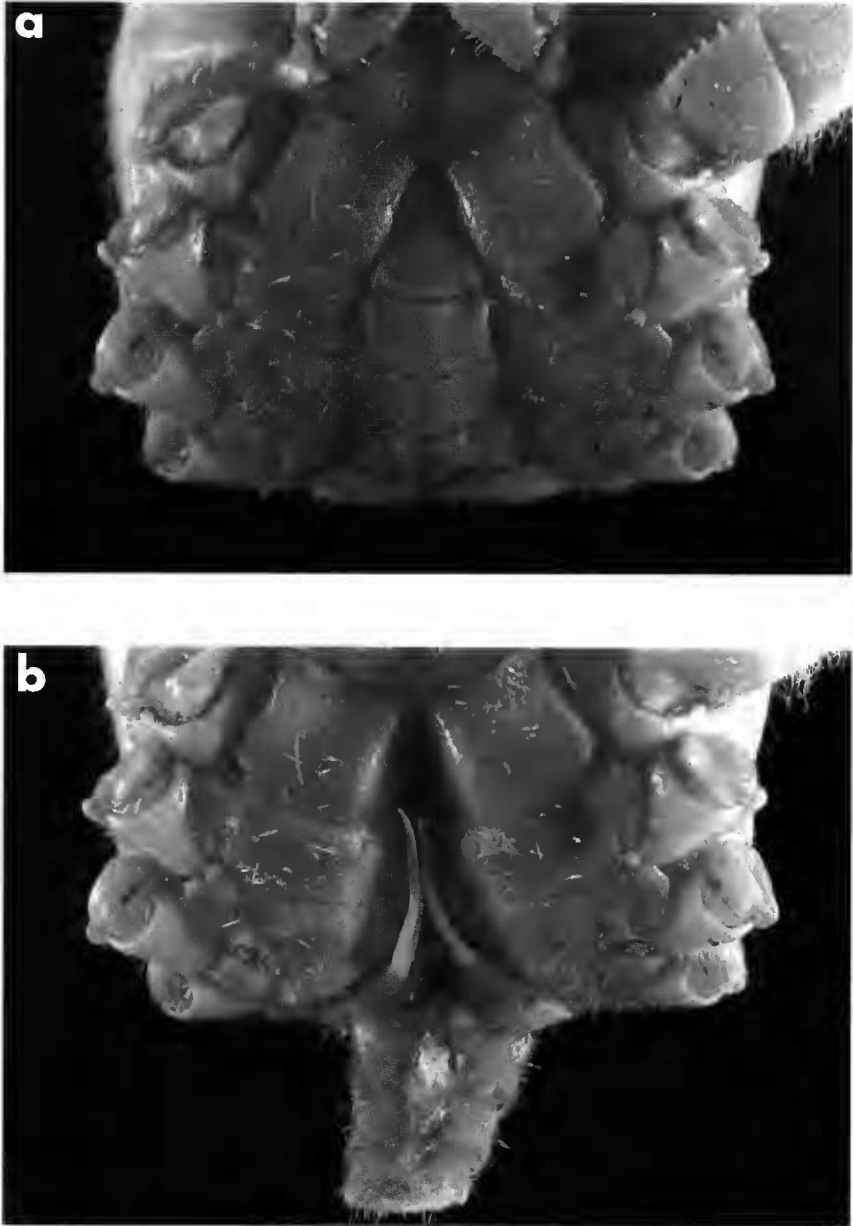


FIG. 6. — *Danielum ixbauchac* new genus, new species, male (SMIOM 04068), length: 19.1 mm. a, sternum-abdomen, b, abdominal depression, first gonopods *in situ*.
Danielum ixbauchac n. g., n. sp., mâle (SMIOM 04068), longueur : 19,1 mm. a, sternum-abdomen ; b, dépression abdominale, premiers gonopodes *in situ*.

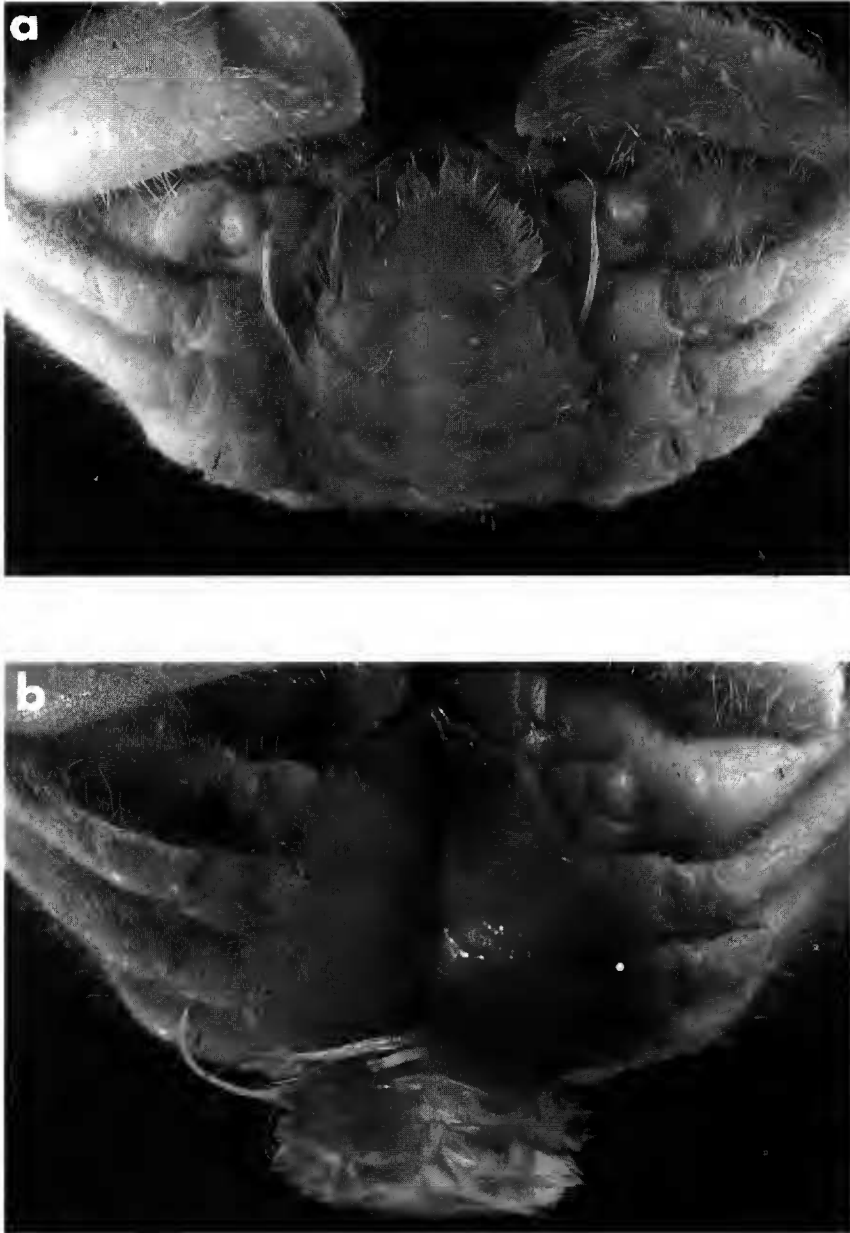


FIG. 7. — *Danielum ixbauchac* new genus, new species, female (SMIOM 04069), length: 13.8 mm. a, abdomen; b, sternum removed abdomen.

Danielum ixbauchac n. g., n. sp., femelle (SMIOM 04069), longueur : 13,8 mm. a, abdomen ; b, abdomen avec sternum enlevé.

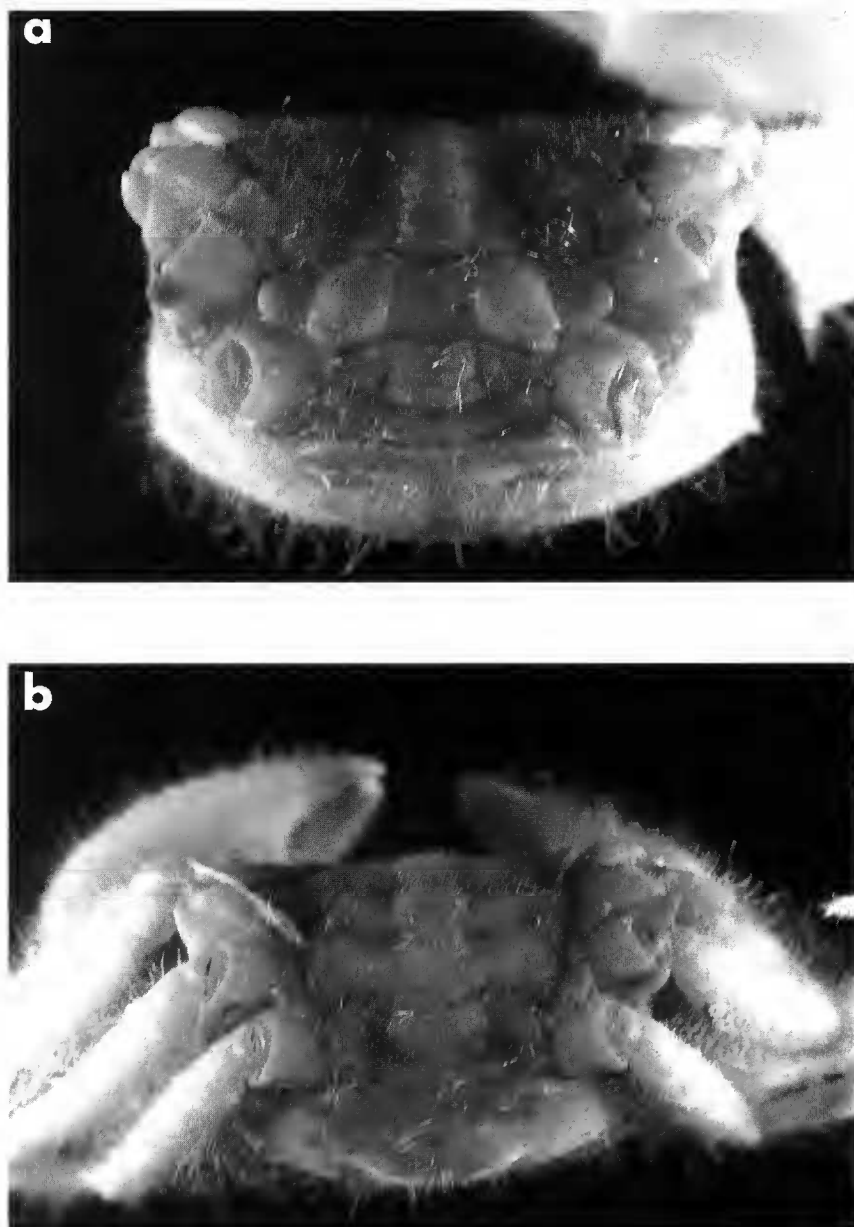


FIG. 8. — *Danielum ixbauchac* new genus, new species, first abdominal segments at level of cx5. a, male (SMIOM 04068), length: 19.1 mm; b, female (SMIOM 04069) length: 13.8 mm.

Danielum ixbauchac n. g., n. sp., premiers segments abdominaux au niveau de cx5. a, mâle (SMIOM 04068), longueur : 19,1 mm ; femelle (SMIOM 04069), longueur : 13,8 mm.

two important differences with this family. In pilumnids, the first gonopod is curved with the apex bent and crooked and there is generally a small portion of the 8th sternite visible. It should be pointed out that some members of Pilumnidae *sensu lato*, like genus *Rhizopa* Stimpson, 1858 (GUINOT, 1969: Figs 109-111), do not present the typical apex shape of first gonopod (not curved, not crooked); nonetheless, the second pleopod is short and sigmoid as in a pilumnid. This last genus is not a typical pilumnid, but it represents a more advanced evolutive state, perhaps another branch of the vaste "pilumnid-line" (GUINOT, 1969). In another genus, *?Pilumnus palmeri* (GARTH, 1986: 9-11, Fig. 46), the first gonopod is simple, cylindrical and tapering slightly to blunt. Also in *Bathypilumnus sinensis* (GORDON, 1931) comb. nov. (NG & TAN, 1984; Figs A-D), the first male gonopod is straight, long and slender like *Halimede* de Haan, 1833.

In only a few species, like *Halimede* aff. *ochtodes* (GUINOT, 1979, Fig. 24c) the 8th sternite is completely covered by the abdomen. This species is not a Xanthidae (as pointed out by BALSS, 1957: 1648), but a Pilumnidae *sensu lato* (GUINOT, 1978: 203, and pers. comm).

In spite of the absence in *Danielum* new genus of the two pilumnid features (male pl1 with the apex not bent, no portion of sternite 8th visible), we prefer to consider the sigmoid form of the second gonopod which reveals to be the most constant characteristic of the pilumnid line as the conclusive criterion for its relationship with the pilumnids. We decided to treat this genus as a Xanthoid Pilumnid, although the exact relationships of *Danielum* new genus with other genera of Pilumnidae *sensu lato* are to be precised.

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